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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/829,876 | 04/10/2001 | Shuichi Kikuchi | 10417-076001 | 7681 |
| 26211 | 7590 | 04/30/2004 | EXAMINER | |
| FISH & RICHARDSON P.C. 45 ROCKEFELLER PLAZA, SUITE 2800 NEW YORK, NY 10111 | | | OWENS, DOUGLAS W | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2811 | |
| DATE MAILED: 04/30/2004 | | | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/829,876

Applicant(s)

KIKUCHI ET AL.

Examiner

Douglas W Owens

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 March 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) 1-4 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 5-7, 19 and 21 is/are rejected.
- 7) ☒ Claim(s) 8-18, 20 and 22-27 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: Claim 8 requires that a high concentration be formed, wherein the high impurity concentration layer (11A, 11B, 11C) spans from one end of the first gate insulation (4) to the third drain region (10) and the high impurity concentration region is low near a surface of the substrate. There is no antecedent basis for these limitations in the written specification. The region 11A, 11B and 11C is described as having a "middle concentration" (page 16, line 25; page 18, line 23).

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 8, 10, 12, 14, 16, 18, 20, 23, 25 and 27 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 8 requires that a high concentration be formed, wherein the high impurity concentration layer (11A, 11B, 11C) spans from one end of the first gate insulation (4) to the third drain region (10) and the high impurity concentration region is low near a

surface of the substrate. There is no support for these limitations in the disclosure. The region 11A, 11B and 11C is described as having a "middle concentration" (page 16, line 25; page 18, line 23).

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 5 – 7, 19 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by US patent No. 5,578,514 to Kwon et al.

Regarding claim 5, Kwon et al. teaches a method of making a semiconductor device comprising the steps of:

implanting an impurity of a first type (23) in a semiconductor substrate (12) of a second type in a single implantation step;

providing a first gate insulation film (26) by applying heat treatment in a single step;

diffusing the implanted impurity (Col. 2, line 65 – Col. 3, line 9);

providing a second gate insulation film (30) on the substrate in a different location than the first gate insulation film;

providing a gate electrode (32) that spans from the first gate insulation film to the second gate insulation film;

providing a source region (34) of the first conductivity type; and

providing a third drain region (36) of the first conductivity type.

Kwon et al. does not explicitly teach that the impurity region (23) is diffused such that a first drain region is formed, with a second drain region having a different concentration than the first drain region and further, where the second drain region is above the first drain region. Kwon et al. teaches performing a thermal step for the purpose of diffusion drive in after the implantation step. Kwon et al. discloses that the diffusion drive in step is performed at approximately 1100° C for approximately 120 – 240 minutes (Col. 3, lines 6 – 10). The Applicant discloses that diffusing a first implant forms the first and second drain regions. The method taught by Kwon et al. would have inherently resulted in a device having first and second drain regions as claimed in the instant application since the steps performed subsequent to the implant are nearly identical.

Regarding claim 6, Kwon et al. does not explicitly teach that providing the first and second drain comprises diffusing impurities from the first gate insulating film. The method taught by Kwon et al. would have inherently resulted in impurities being diffused from the first gate insulating film since the method is nearly identical to that of the claimed invention.

Regarding claim 7, Kwon et al. teaches a method further comprising:

providing a layer of the first conductive type (14) to span from one end of the first gate insulation film to the third drain region.

Regarding claim 19, Kwon et al. does not explicitly teach a first drain region that has a lower impurity concentration than the second drain region. The method taught by

Kwon et al. would have inherently resulted in a first drain region with a lower impurity concentration than the second drain region since the method is the nearly identical to that of the claimed invention.

Regarding claim 21, Kwon et al. teaches a method of manufacturing a device, wherein the source region is in direct contact with the substrate.

Allowable Subject Matter

6. Claims 8 – 18, 20 and 22 – 27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

7. Applicant's arguments filed March 18, 2004 have been fully considered but they are not persuasive.

Applicant argues that Kwon et al. does not teach forming the first and second drain region from an impurity formed in a single implant step. Applicant supports the argument by citing several impurity regions, which were not applied in the previous rejection. Kwon et al. teaches a single implant (23) followed by performing a thermal step for the purpose of diffusion drive in after the implantation step. Kwon et al. discloses that the diffusion drive in step is performed at approximately 1100° C for approximately 120 – 240 minutes (Col. 3, lines 6 – 10). The Applicant discloses that diffusing a first implant forms the first and second drain regions. The method taught by Kwon et al. would have inherently resulted in a device having first and second drain

regions produced from a single implant step, as claimed in the instant application, since the steps performed subsequent to the implant are nearly identical.

Applicant further argues that Kwon et al. does not teach a conductive layer above the first and second drain regions. The conductive layer (14) taught by Kwon et al. extends to the surface of the substrate, which is at least elevationally over the first and second drain region (24).

Applicant argues that Kwon et al. does not teach that the source region is in direct contact with the substrate. Since the source region taught by Kwon et al. is formed in the substrate, it must be in direct contact with the substrate.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas W Owens whose telephone number is 571-272-1662. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C Lee can be reached on 571-272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DWO



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SUPERVISORY PATENT EXAMINER
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